Mark: $\frac{19}{25}$

Electrical Measurements

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25

Q1 The persistence: The time required for the emitting light to decay to a certain value, usually 10% of the original light output.

تعريفات

4

The luminance: The intensity of the light emitted from the CRT screen.

Q2 ⊛ $f = \frac{1}{2\pi\sqrt{C_1 C_3 R_1 R_3}} = \frac{1}{2\pi\sqrt{0.4\times10^{-6}\times0.4\times10^{-6}\times2\times10^{3}\times2\times10^{3}}}$

$= \frac{1}{2\pi\sqrt{0.64\times10^{-6}}} = \frac{1}{2\pi(8\times10^{-4})}$

$= \frac{1}{5.026\times10^{-3}} = \boxed{198.9\ HZ}$

سؤال عن Wien Bridge

① Frequency ② أوجد R4

⊛ $\frac{R_2}{R_4} = \frac{R_1}{R_3} + \frac{C_3}{C_1}$

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$\frac{10\times10^{3}}{R_4} = \frac{2\times10^{3}}{2\times10^{3}} + \frac{0.4\times10^{-6}}{0.4\times10^{-6}} = 1+1 = 2$

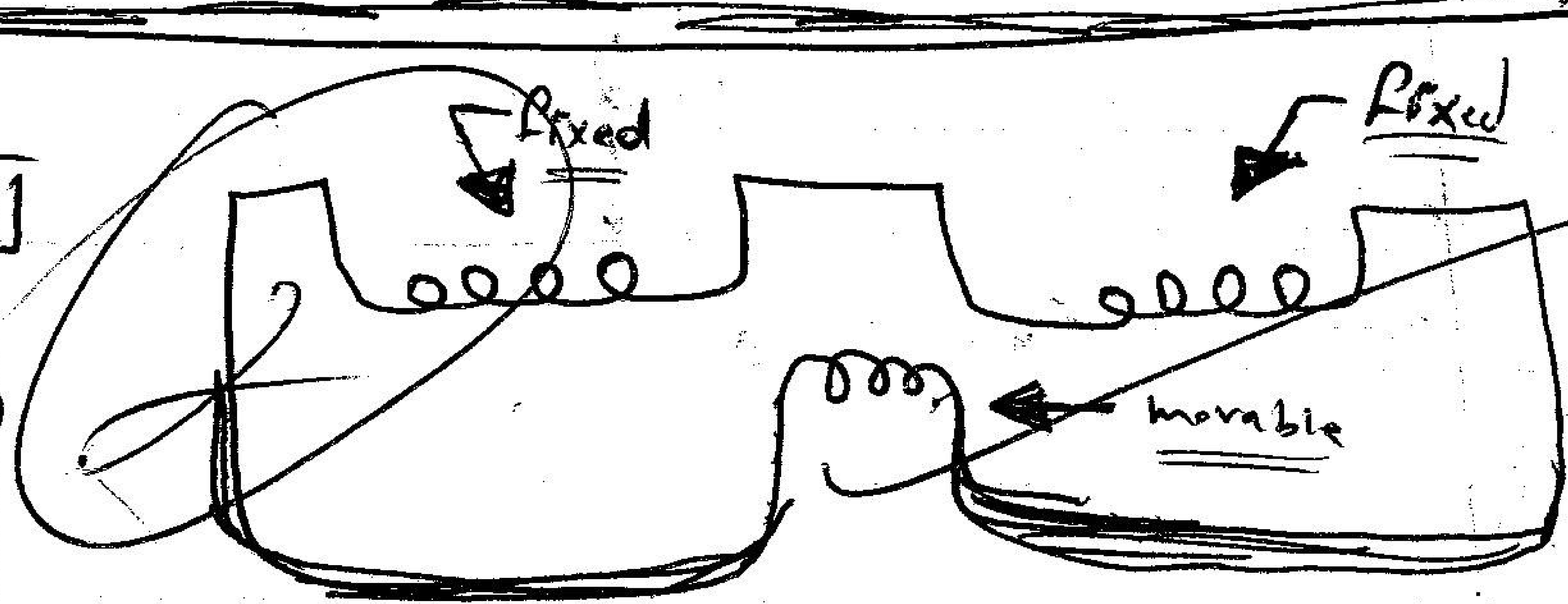
$\therefore \frac{10\times10^{3}}{R_4} = 2 \Rightarrow R_4 = \frac{10\times10^{3}}{2} = 5\times10^{3} = \boxed{5k\Omega}$

Q3

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سؤال عن electrodynamometer مبدأه وتركيبه وكاتونه

b)



3.5

a) The basic Principle of operation: is to generate under measurement current in order to produce magnetic field flux (produced from the movement of movable part).

(c)

$D \propto i^2$ → $I\uparrow \rightarrow D\uparrow$

If the current increases, the deflection in the electrodynamometer will be increased automatically

$D = \sqrt{\frac{1}{T}\int_0^t i^2\,dt}$ → $D \propto i^2$

Q4 (b) $\theta = 180°$

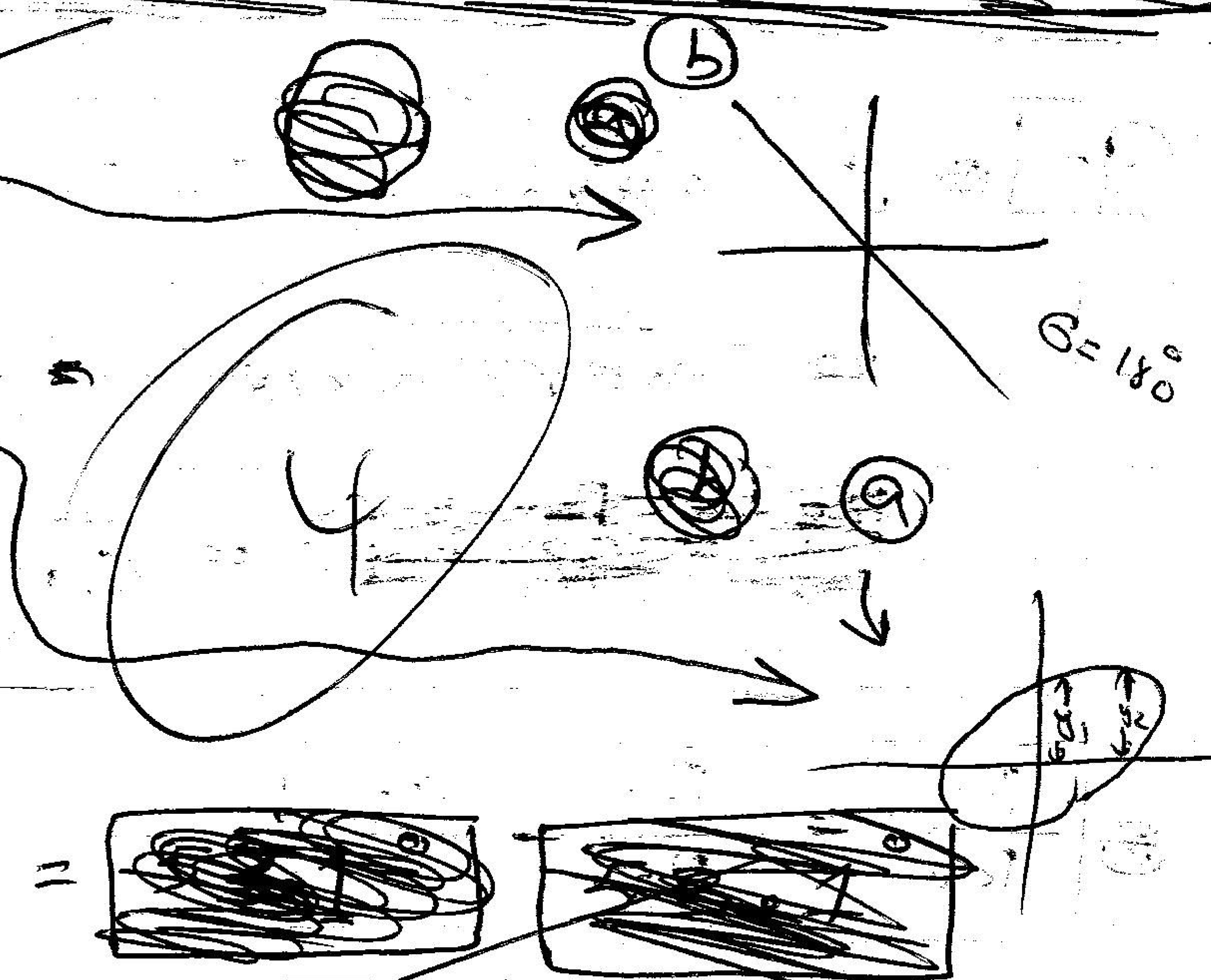
(a) $\sin\theta = \frac{y_1}{y_2}$

$\sin\theta = \frac{2}{2.5}$

$\therefore \sin\theta = 0.8$

$\theta = \sin^{-1}(0.8) = 53.1°$

سؤال عن Lassajons figures



Q5

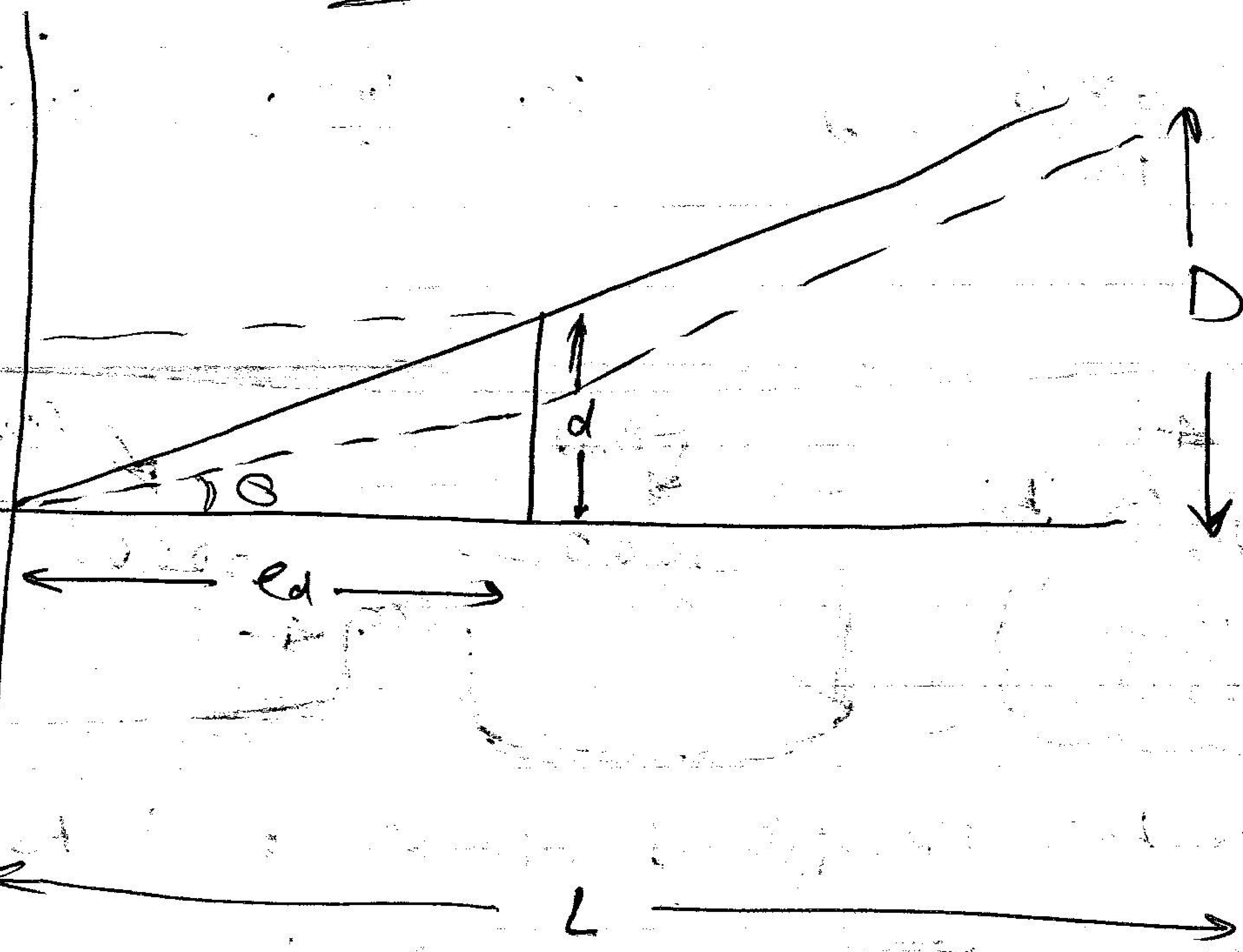
$D = \frac{L\, l_d\, E_d}{2d\, E_a}$

Deflection

سؤال إثبات
إثبت القانون التالي

$D = \frac{L\, l_d\, E_d}{2d\, E_a}$

مع الرسم



- $f = m a_y$
- $a_y = \frac{f}{m} = \frac{e E_y}{m}$
- $V_y = \frac{e E_y}{m} t$
- $V = V_0 + at$
- $X = X_0 + V_0 t + \frac{1}{2} a t^2$

$$D = \frac{L \, l_d \, E_d}{2 V_0^2 X} \Rightarrow \frac{L \, l_d \, E_d}{2d \, E_a}$$

$$2 V_0^2 X = 2d \, E_a$$

$$S = \frac{D}{E_d} = \frac{l \, L_d}{2d \, E_a}$$

$$G = \frac{1}{S} = \frac{2d \, E_a}{l \, l_d}$$

There is a relationship between Newton's Laws and the deflection of electron beam between blates in the CRT screen

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Finished

تم بحمد الله